


Geographical simulation analysis of the development of Thilawa and Myanmar

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Ikumo ISONO[†] and Satoru KUMAGAI

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Keywords: Simulation, new economic geography, Myanmar, special economic zone

JEL classification: O53, R12, R13

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Ikumo ISONO[†] and Satoru KUMAGAI

Abstract

We use a geographical simulation model to assess the economic impacts of special economic zones (SEZs) and other policy measures in Myanmar. We compare cases wherein SEZ development is concentrated in Thilawa/Yangon with those wherein it is dispersed among 15 districts. We find that concentrated development has a much larger economic impact on Myanmar. Moreover, this impact is larger when we assume the development of a domestic economic corridor and regulatory reform in addition to the development of Thilawa and may reduce the excessive inflow of households into the Yangon area. We also discuss how delaying the dispersion of development affects the economic impacts on Yangon and other regions as well as on Myanmar.

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1. Introduction

Using the Institute of Developing Economies-Geographical Simulation Model (IDE-GSM), we compare the economic impacts of special economic zones (SEZs) and other policy measures of Myanmar. The Institute of Developing Economies (IDE-JETRO), together with the Economic Research Institute for ASEAN and East Asia (ERIA), has been developing the IDE-GSM since 2007 (Kumagai *et al.* 2013). The main purpose of the model is to predict the economic impact of physical or institutional integration on regions at the sub-national level. It can also be used to predict the types of policy measures that are favorable for stable and balanced economic development of the regions by identifying potential bottlenecks and thus extracting the full merits of economic integration. In fact, IDE-GSM simulation analyses have been used in many policy research projects and conveyed to policy makers.

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In 2012, the governments of Myanmar and Japan signed a memorandum of understanding to establish an SEZ in Thilawa. In 2014, with the support of the Ministry of Economy, Trade and Industry of Japan, the Myanmar Japan Thilawa Development Limited was established in Yangon to develop the Thilawa SEZ, which has been fully operational since September 2015. As of November 2016, 20 companies have started operations, 32 companies have begun factory construction, and 26 companies have officially decided to locate in the SEZ.¹ Consequently, there is growing discussion on how the Thilawa SEZ can be promoted as well as the next steps to be taken.

In Myanmar, lack of quality data remains a challenge to conducting quantitative analyses. However, waiting for precise data to become available is unfeasible because of the urgent need for policy recommendations on development strategies. Despite the challenges, the IDE-GSM has been used along with night-time satellite image to estimate and construct regional economic data and conduct simulations. For Myanmar, IDE-GSM has been employed for four notable simulation analyses.

First, the ERIA (2010) found that Myanmar would be the largest beneficiary of economic integration and infrastructure development in the Mekong region. At that time, the IDE-GSM analysis simulated a higher speed of trucks and less time at the border. Even though two economic corridors were assumed—the East–West Economic Corridor and the North–South Economic Corridor (with both covering relatively remote areas of Myanmar)—Myanmar experienced the largest economic impact of the countries in the Mekong region. In fact, in that version of the IDE-GSM, regulatory barriers were not separated and were thus included in the time required at the border. Hence, reducing the time at the border meant not only shortening the physical time at the border but also implementation of overall regulatory reforms. The analysis showed that Myanmar had much room to improve the regulatory environment at that time.

Kudo and Kumagai's (2012) study is directly linked to our study. It compared the economic impact of different industrial sites by using IDE-GSM simulation and concluded that developing industrial sites in two places—Yangon and Mandalay—would have a bigger economic impact on Myanmar than developing an industrial site in Yangon or developing sites in 15 regions. In addition, they assumed that domestic economic corridors should be developed with industrial sites but then

¹ Thilawa SEZ Report (Thilawa SEZ Tsuushin) No 12, JETRO, 30 November, 2016.

found that domestic economic corridors would be effective in dispersing the economic impact to the whole country.

With the democratization of Myanmar, many investors became interested in the Yangon area. Isono and Kumagai (2013) compared situations wherein the government only invested in Yangon with those wherein the government developed domestic economic corridors in addition to the industrial site in Yangon.

The ERIA (2015) examined the overall development scenario in East Asia and the scenario included domestic economic corridors in Myanmar, regulatory reform, and SEZ development in eight regions in 2020 and Dawei in 2025. The eight regions were selected from Yangon and Mandalay, five cities relatively close to China and Thailand, and Kyaukpyu, which was supposed to have a deep-sea port and was designated as an SEZ site. The results showed that five regions of Myanmar—Dawei, Kawthoung, Tachileik, Kengtung, and Myeik—would economically benefit the most among all regions in East Asia.

In this paper, we compare the cases wherein SEZ development is concentrated in Yangon with those wherein it disperses among 15 regions in Myanmar from 2017. Kudo and Kumagai (2012) introduced the so-called bipolar development policy, which encompassed industrial sites in Yangon and Mandalay, and concluded that it could deliver slightly higher economic impacts for Myanmar than could unipolar development, which established industrial sites in just Yangon; however, two points should be noted. First, their study assumed incremental technology parameters in Yangon and Mandalay by dividing the increment in the Yangon-only scenario by the population share of the two regions while assuming no fixed costs to establish a new industrial site. If there is a fixed cost to making laws and regulations, establishing a development company, and providing officials to manage the SEZ, the incremental technology parameter of each region could be smaller than that derived by dividing the population share. Thus, the economic impact of bipolar development on Myanmar could be smaller than that suggested by that study's results. Second, the situation has changed since that study in that there is now an SEZ in operation in Yangon.

Therefore, it is reasonable to start with concentrating development in Yangon, as we are doing, and other alternative policies. Although it is desirable to introduce fixed costs to establish new industrial estates, we do not have enough data on the costs. For that

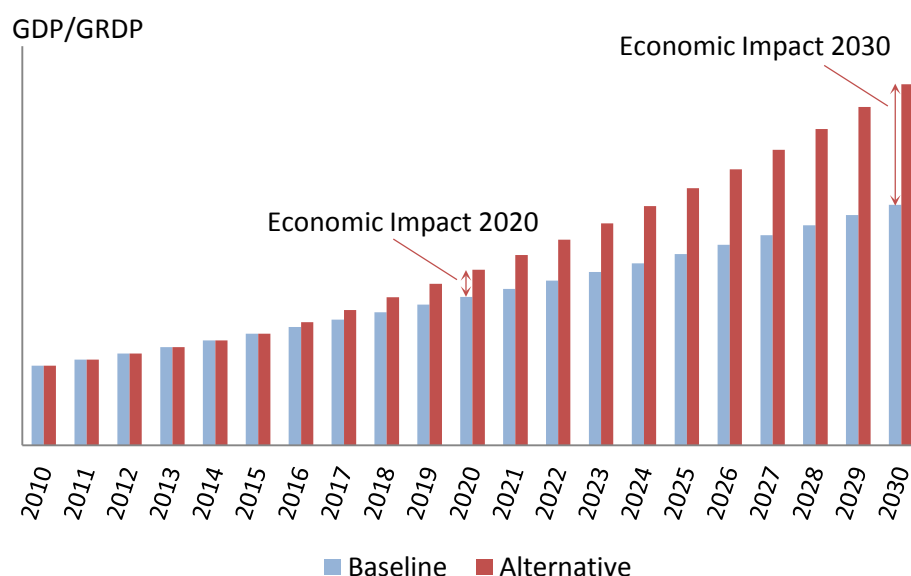
reason, we just compare the development of Yangon with that of 15 regions without introducing fixed costs, with a note that the latter may experience smaller economic impacts owing to the presence of fixed costs. Next, we compare the scenarios wherein we concentrate SEZ development in Yangon, disperse SEZ development among 15 regions from 2017, and disperse SEZ development among 15 other regions from 2021.

Section 2 explains our comparison in the simulation analysis. Section 3 compares developing SEZs in Yangon only and dispersing to 15 different regions. Section 4 adds other policy measures to the Yangon/Thilawa development. Section 5 examines the possibility of delay in dispersing SEZ development from 2021 and the likely consequences. Section 6 presents some policy recommendations.

2. Assumption of the Scenarios

We run simulations for the baseline scenario and for several alternative policy scenarios (Figure 1). The baseline scenario assumes the least number of policies. In an alternative policy scenario, we change assumptions of productivity of regions or other parameters to correspond to the policy measures of concern. For example, we raise the productivity parameter of the regions where an SEZ is constructed. We run simulations and compare gross domestic product (GDP) and regional GDP (GRDP) between the baseline scenario and alternative scenario in specific years, i.e., 2020 and 2030. If the alternative scenario produces a larger GDP of a country or GRDP of a region in the results than does the baseline scenario, we consider the project as having a positive economic impact on the country or region, respectively. If GDP/GRDP in the alternative scenario is lower than that in the baseline scenario, a negative economic impact is suggested. Readers should be reminded that negative impacts by an alternative scenario do not necessarily mean that GDP and GRDP in 2020/2030 become lower than those of 2016 because we compare GDP/GRDP between the baseline and alternative scenarios in the same year.

Figure 1: Measuring Economic Impact



Source: Authors

We now change the technological parameter in the alternative scenarios. The technological parameters are set by industry and region and are assumed to increase every year in the baseline scenario. The technological parameter in the model includes elements such as the following:

- Education and skill level
- Logistics infrastructure within the region
- Communication infrastructure within the region
- Electricity and water supply
- Equipment in firms
- Efficiency of utilization of the infrastructure and equipment by households and firms

Raising technological parameters means the government will put in additional effort to make elements of technological parameters better than those seen in the baseline scenario. Since the parameters include education and training of workers and the utilization efficiency of infrastructure and equipment of a region, it is not realistic to expect the government to suddenly double or triple the parameter. Instead, we assume gradual increments of the parameter through policy intervention. SEZ development does not merely mean physical development of land for SEZ; instead, it may include laws and regulations, stable water and electricity, training program for workers, engineers

and managers, and even new schools to raise the skill level of workers.

3. Concentration or Dispersion

We define two alternative scenarios to compare whether concentration of SEZ development is more favorable for Myanmar than dispersing the development to many regions. Specifically, we set the scenarios as follows:

Scenario 1 (SC1):

Concentrating SEZ development in Thilawa

In 10 years (2016–2025), we gradually raise the productivity parameters of Yangon for the manufacturing and service sectors so that the productivity parameters of Yangon in 2025 will be double of those in the baseline scenario.

Scenario 2 (SC2):

Dispersing SEZ Development to 15 Districts from 2017

In 2016, productivity parameters of Yangon will rise to the level of those in Scenario 1. From 2017 to 2025, we reduce the increment of the productivity parameter of Yangon and increase the parameters for the other 14 regions. The increments of the parameters for Yangon are divided proportionally by the ratio of the population of Yangon to the population of Yangon and 14 other regions. Specifically, the increment is defined as

$$\left(\text{Increment of the parameter of Yangon in Scenario 1} \right) \cdot \frac{(\text{Population of Yangon})}{(\text{Sum of populations of 15 regions})}$$

Further, the increments of the parameters for 14 regions are defined as follows:

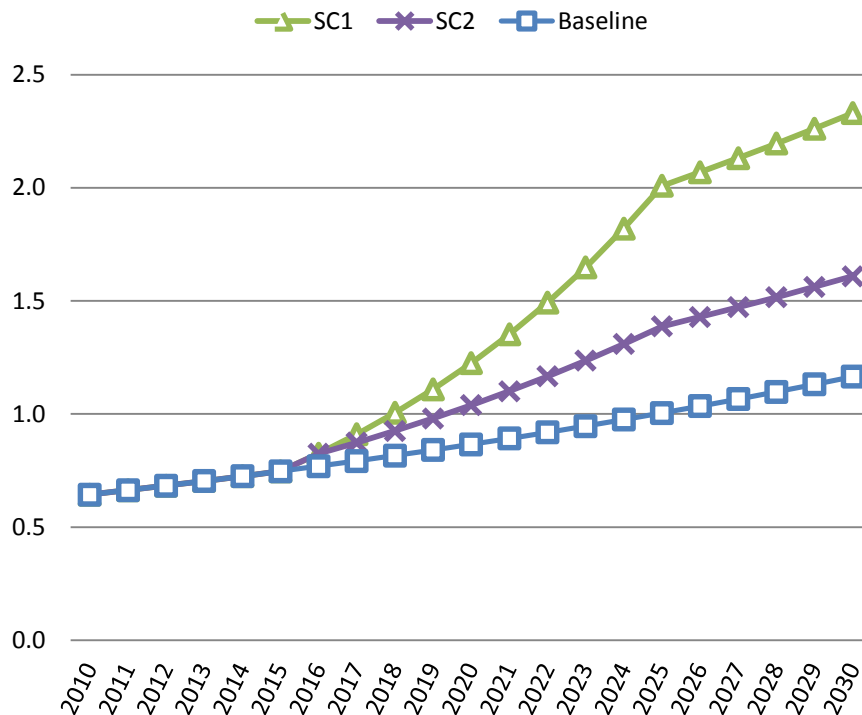
$$\left(\text{Increment of the parameter of Yangon in Scenario 1} \right) \cdot \frac{(\text{Sum of populations of 14 regions})}{(\text{Sum of populations of 15 regions})}$$

These 14 regions are selected by adopting Kudo and Kumagai's (2012) assumptions.

In our model, SEZ development is described as enhancement of the technology parameter with respect to that of the baseline scenario. The technology parameter is calculated as the difference between the GRDP of a region simulated from other regions' economies and the accessibility to these other regions and the actual GRDP of the

region. In other words, the technology parameter is a residual that cannot be explained by the surrounding economy and is seen as comprising the level of transport and other infrastructure within the region, education and training levels, and the efficiency of the firm in terms of production. In Scenario 1, we assume that Yangon's technology parameter will double in 2025 compared with the baseline scenario. In Scenario 2, we assume the increase of the technology parameter will be distributed to 15 districts by the share of population from 2017 to 2025 so that the increment of Yangon's technology parameter will be lower than that in Scenario 1.² Figure 2 illustrates our assumption about the technology parameter for the auto industry in Yangon for Scenarios 1 and 2 and the baseline scenario.

Figure 2: Technology Parameter of the Automotive Industry in Yangon



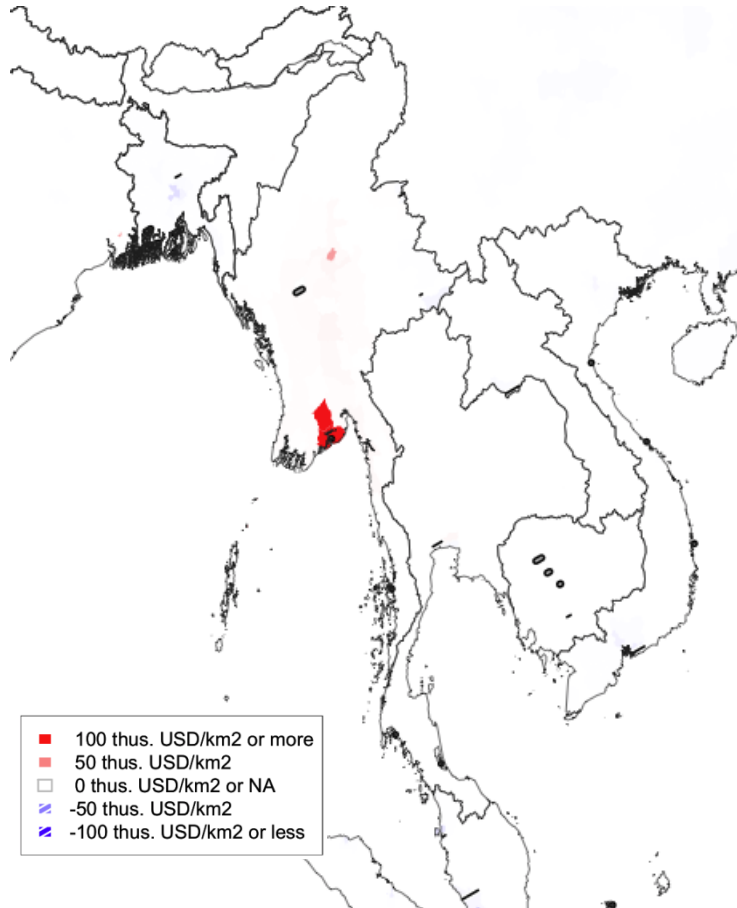
Source: Authors

Figures 3 and 4 show the economic impact by each scenario in 2020. Throughout the paper, regions in red represent those with a positive impact and regions in blue (and shaded) are those with a negative impact. Scenario 1 mainly benefits Yangon. Even though most of the other regions of Myanmar will have a positive impact, they are

² In this scenario, we do not account for any fixed costs associated with constructing an additional SEZ.

negligible in overall results.

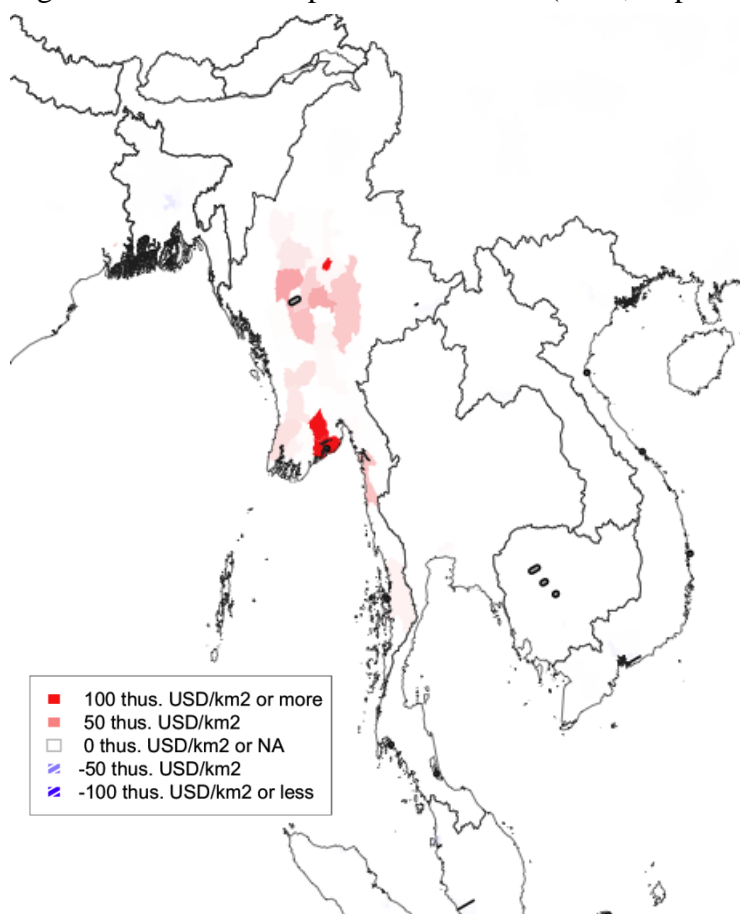
Figure 3: Economic Impact of Scenario 1 (2020, Impact Density)



Source: IDE-GSM simulation results

The economic impact of Scenario 2 will disperse among many regions as shown in Figure 4. Although we disperse the SEZ development proportionally on the basis of the population of each region, we anticipate higher economic impact in Yangon and Mandalay and relatively lower positive impact in the other regions that have a new SEZ. This means that Yangon and Mandalay have better business environments, so many firms want to operate in those cities rather than in the other regions. This result corresponds to Kudo and Kumagai's (2012) argument.

Figure 4: Economic Impact of Scenario 2 (2020, Impact Density)



Source: IDE-GSM simulation results

Table 1 shows the economic impact on Myanmar as a whole, on Yangon, and on the other regions of Myanmar by scenario. A trade-off between the development of the country and of the regions other than Yangon can be observed. If we concentrate development in Yangon, as in Scenario 1, Myanmar as a country will experience a larger positive economic impact than the other regions. The economic impact of Scenario 1 on regions other than Yangon was only 3.8% in 2030. If we disperse the SEZ development among 15 districts from 2017, as in Scenario 2, the economic impact on the country in 2030 will be less than half of that in Scenario 1. In the case of Scenario 2, 14 regions with SEZ development from 2017 will have more than four times the positive impact of Scenario 1. On the other hand, the other regions that have experienced no SEZ development will have an even smaller impact than that in Scenario 1. This result suggests that dispersing development to 15 regions will not only lower the economic impact on the country but also prove to be an ineffective policy measure for its balanced development because it may accelerate the movement of

households and industries from remote regions to Yangon and the 14 other regions.

Table 1: Economic Impact by Scenario: Concentration or Dispersion

	2020		2030	
	SC1	SC2	SC1	SC2
Myanmar	15.8%	10.6%	98.4%	40.6%
Yangon	51.2%	24.0%	287.7%	78.9%
14 Regions	0.5%	11.3%	3.1%	49.6%
Other Regions	0.4%	0.4%	4.3%	1.3%

Source: IDE-GSM simulation results

Since it is clear that dispersing development to all districts is impossible owing to budget constraints and the enormous fixed costs involved in constructing a new SEZ, it can be claimed that just dispersing the development will not be a solution to pursuing higher economic growth of the country or to narrowing the development gap among regions.

4. Combining Other Policy Measures with the Thilawa Project

Previous studies like ERIA (2015) have suggested combining international and domestic economic corridors and regulatory reform with SEZ development. If there were no economic corridors connecting production sites, the production network would not be expanded and production of manufacturing goods would remain in a smaller number of places with industrial sites. Estimations have shown that regulatory barriers account for the majority of all barriers in international trade. Thus, reducing regulatory obstacles is essential to benefit from other countries' economic development and extract the full merits of economic integration in East Asia. Nevertheless, merely constructing roads and lowering policy barriers is insufficient. If there is no improvement in productivity, constructing roads and putting in place regulatory improvements may lead to impeding production in the country, particularly in the manufacturing sector, because firms and households might buy products from neighboring countries at lower prices and could stop domestic production. The improvement in productivity, according to this argument, is not necessarily restricted to constructing SEZ. High-quality roads within a region, stable supply of electricity and water, and better education and training through schools and vocational schools are key components in enhancing productivity and are

necessary to ensure stable economic development of the country.

In this regard, we detail a scenario in which road and port development as well as regulatory reform and productivity enhancement are added to SEZ development in Yangon.

Scenario 1a (SC1a):

Combining Other Measures with Thilawa

Over 10 years (2016–2025), we gradually raise the productivity parameters of Yangon for the manufacturing and service sectors so that the productivity parameters of Yangon in 2025 will be double those of the baseline scenario in 2025.

Over 10 years (2016–2025), we raise the productivity parameters of all sectors of all regions of Myanmar, other than Yangon, by 1% every year. For Yangon, we increase the productivity parameter of the agricultural sector by 1% every year from 2016 to 2025.

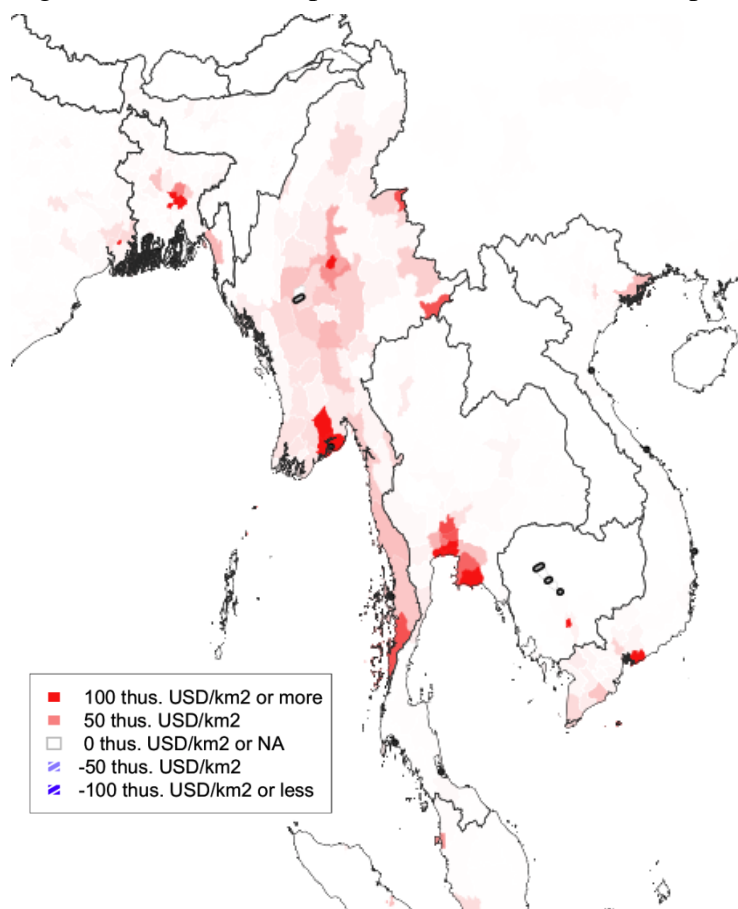
For Yangon, we reduce non-tariff barriers for all sectors by 2% from 2016 to 2020, and for the other regions of Myanmar, we reduce non-tariff barriers for all sectors by 1% from 2016 to 2025.

In 2020, we introduce better road network in Myanmar, as proposed by the ERIA (2015). Border facilitation is introduced to reduce time and costs at the land border to Thailand, China, and India.

A better road network in Myanmar will come from expressways and other trunk highways connecting different regions of Myanmar. It includes an expressway between Yangon and Mandalay via Naypyidaw, Mandalay and Muse, Mandalay and Tamu via Gangaw, Yangon and Maubin, Yangon and Pyapon, Payagyi and Kawkareik, and Dawei and Htee Khee. It also includes other trunk highways between Thaton and Kawthoung, Yangon and Mandalay via Pyay and Pakokku, Meiktila and Tachileik/Mong La, Lashio and Loilen, Naypyidaw and Sittwe/Kyaukpyu, Muse and Puta-O, and Monywa and Kale via Ywathit.

Figure 5 illustrates the economic impact of Scenario 1a in 2030, and Figure 6 provides the same for 2030. The results show that more regions will have a higher economic impact than that in Scenario 1 (Figure 3) or Scenario 2 (Figure 4). In this scenario, some border regions besides Yangon and Mandalay will have a higher economic impact, such as Muse, Tachileik, and Kawthoung.

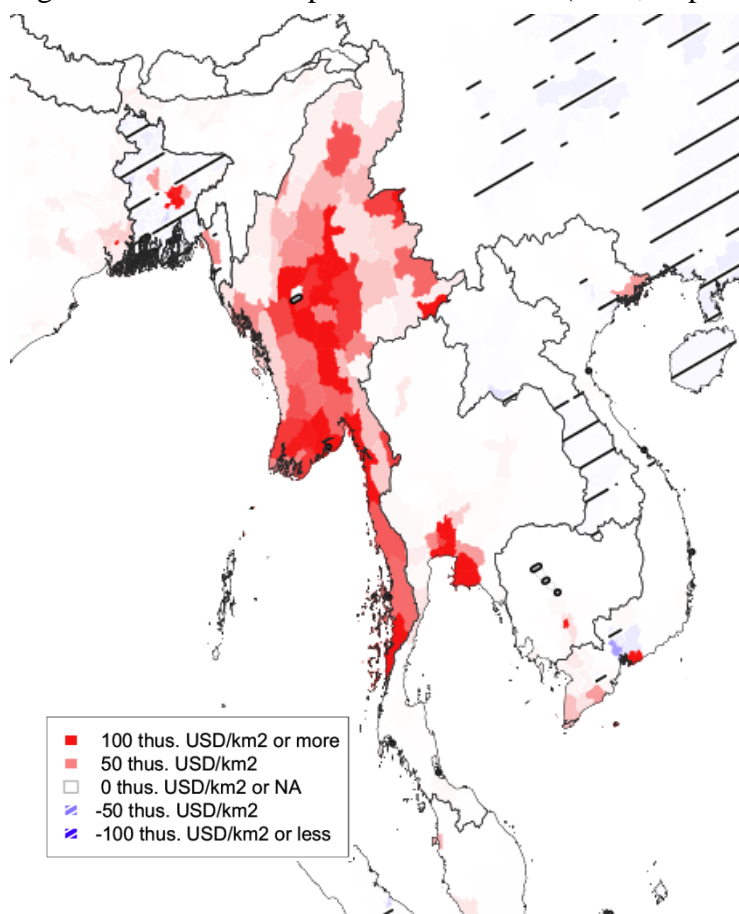
Figure 5: Economic Impact of Scenario 1a (2020, Impact Density)



Source: IDE-GSM simulation results

In 2030, the regional economic impact will be widespread and amplified. Most of the populated areas of Myanmar will experience a positive impact. In addition, many border areas, represented in red, show that they can benefit from the development of, and regulatory reform in, the country.

Figure 6: Economic Impact of Scenario 1a (2030, Impact Density)



Source: IDE-GSM simulation results

Table 2 explains how this scenario helps Myanmar pursue both overall economic development as well as balanced development. The economic impact of Yangon surpasses those of the other regions because of the SEZ; however, trunk road development, regulatory reform, and productivity enhancement of the regions contribute to the higher economic impact in other regions. In fact, in 2030, the economic impact for Yangon under Scenario 1a is lower than that under Scenario 1, whereas the impact for Myanmar under Scenario 1a is higher than that under Scenario 1. This means the economic impact delivered is more from the other regions than from Scenario 1.

Table 2: Economic Impact by Scenario: Combining Other Measures with Thilawa

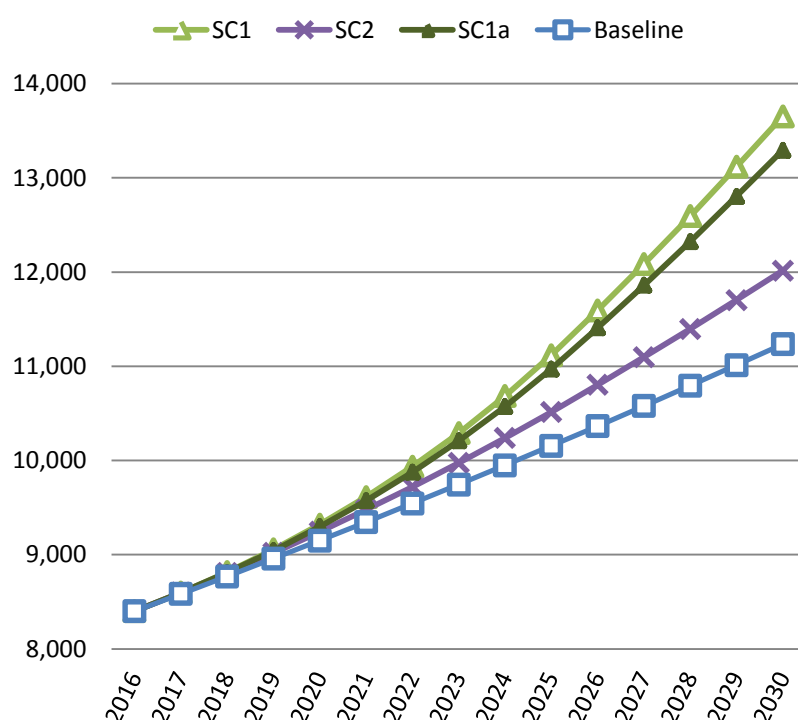
	2020		2030	
	SC1	SC1a	SC1	SC1a
Myanmar	15.8%	25.0%	98.4%	114.5%
Yangon	51.2%	54.9%	287.7%	286.3%
14 Regions	0.5%	11.3%	3.1%	26.6%
Other Regions	0.4%	12.7%	4.3%	29.9%

Source: IDE-GSM simulation results

A note of caution that has to be sounded with this analysis is that Yangon may witness an inflow of households and firms owing to SEZ development. In these scenarios, we do not change the congestion within each region; this assumes that basic infrastructure within a region will be provided at least proportionally as population increases. If basic infrastructure such as housing, roads, electricity, and water is poorly provided compared with population increase, the economic impact stated earlier may materialize.

The expected population of Yangon by scenario is as shown in Figure 7. Even in the baseline scenario, Yangon will have some population inflow from other regions in addition to the natural population growth. The inflow will be magnified by SEZ development and other measures. This figure explains that there is an effect of reducing excessive population inflow to Yangon in Scenario 1a compared with that in Scenario 1, owing to the addition of the domestic economic corridor and regulatory reform. However, this inflow under Scenario 1a will be much larger than that under Scenario 2 or under any baseline scenario.

Figure 7: Estimated Population of Yangon by Scenario (1,000)



Source: IDE-GSM simulation results

5. Delaying the Dispersion

The discussion in Section 4 claimed that concentrating SEZ development in Thilawa/Yangon will have a much larger economic impact on Myanmar. However, this can happen only when the government can manage the inflow of firms and households into Yangon and provide the necessary infrastructure. If this is difficult, the government may think of dispersing SEZ development later, e.g., from 2021. We specify a scenario wherein the government disperses SEZ development from 2021 (Scenario 3) and another scenario wherein the government adds other measures as stated in Scenario 1a into Scenario 3.

Scenario 3 (SC3):

Dispersing SEZ Development to 15 Districts from 202

From 2016 to 2020, the productivity parameters of Yangon will increase as in Scenario 1. From 2021 to 2025, we reduce the increment of the productivity parameter of Yangon and increase the parameters for the other 14 regions. The increments of the parameters

for Yangon and 14 other regions are divided proportionally by the ratio of the population of Yangon to the population of Yangon and 14 other regions, as in Scenario 2.

Scenario 3a (SC3a):

Combining Other Measures after Dispersing SEZ Development from 2021

From 2016 to 2020, the productivity parameters of Yangon will increase as in Scenario 1. From 2021 to 2025, we reduce the incremental productivity parameter of Yangon and increase the parameters for the other 14 regions. The increments of the parameters for Yangon and 14 other regions are given by the ratio of the population of Yangon to the population of Yangon and 14 other regions, as in Scenario 2.

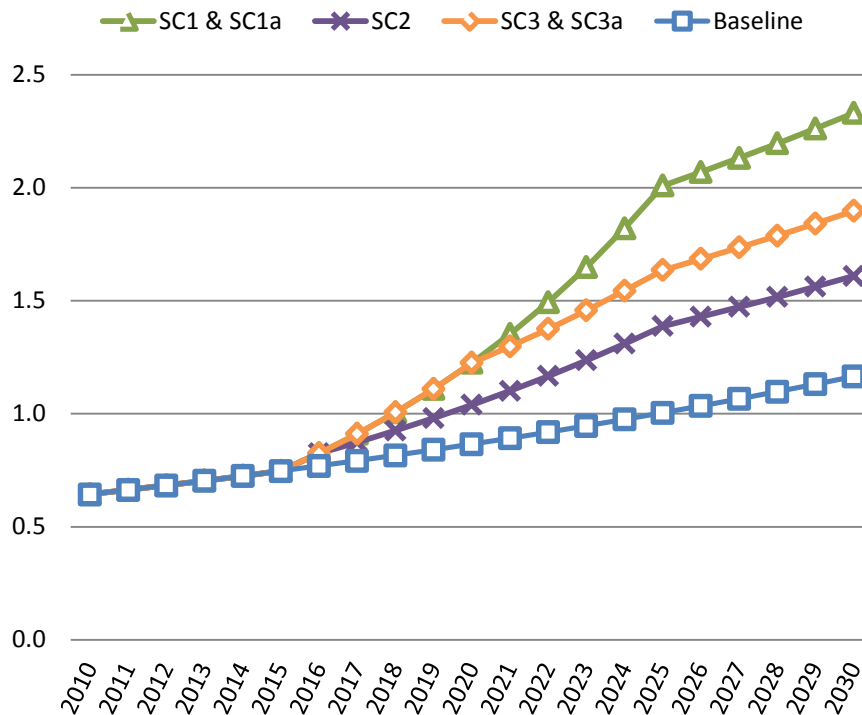
Over 10 years (2016–2025), we raise productivity parameters of all sectors of the regions of Myanmar other than Yangon by 1% every year. For Yangon, we increase the productivity parameter of the agricultural sector by 1% every year from 2016 to 2025.

For Yangon, we reduce the non-tariff barriers for all sectors by 2% from 2016 to 2020, and for the other regions of Myanmar, we reduce the non-tariff barriers for all sectors by 1% from 2016 to 2025.

In 2020, we will have a better road network in Myanmar, as proposed by the ERIA (2015). Border facilitation is introduced to reduce time and costs at the land borders with Thailand, China, and India.

In Scenario 3, we concentrate SEZ development in Yangon up to 2020 and disperse the development among 15 districts from 2021 to 2025. Therefore, technology parameters of Yangon in Scenarios 3 and 3a become larger than those in Scenario 2 but smaller than those in Scenarios 1 and 1a (Figure 8). Following the discussion in Section 4, we can expect that the economic impact on Myanmar in Scenario 3 may also be larger than that in Scenario 2 but smaller than that in Scenario 1. Further, population increase in Yangon in Scenario 3 may be faster than that in Scenario 2 but slower than that in Scenario 1.

Figure 8: Technology Parameter in the Automotive Industry of Yangon

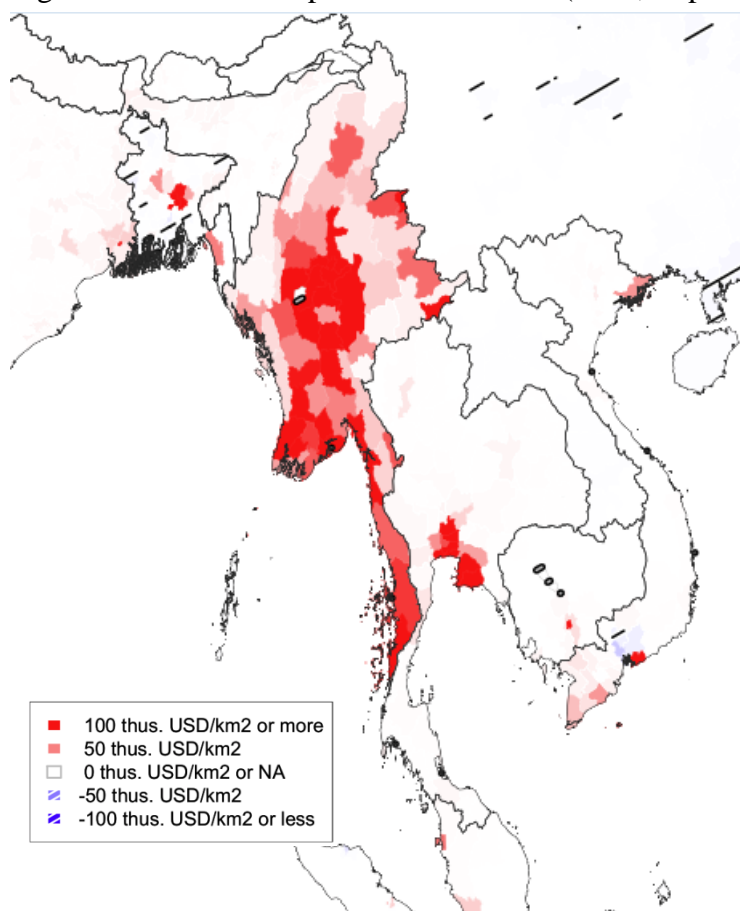


Source: Authors

As in Section 4, we assume there are no fixed costs when establishing a new SEZ. We understand that this is unrealistic, but the assumption can be less restrictive because of potential cost savings from raising the technological parameters in Scenario 3 and 3a. This is because after five years of experience in operating an SEZ in Thilawa/Yangon, the government can use its expertise in other regions to establish a new SEZ.

Figure 9 depicts the economic impact of Scenario 3a in 2030, and Table 3 presents the overall results for all five scenarios conducted in this study. Similar to Scenario 1a, Scenario 3a will yield a higher positive impact not only for Yangon but also for many other regions of the country. As expected, the economic impact for the country in Scenario 3 is larger than that in Scenario 2 and smaller than that in Scenario 1. Similarly, the economic impact on Myanmar and Yangon in Scenario 3a is also smaller than that in Scenario 1a. It must be noted that the economic impact of regions other than Yangon and 14 regions in Scenario 3a will be smaller than those in Scenario 1a. This can be interpreted as the same effect as in Scenario 2 that induces further outflow of firms and households from remote areas of the country.

Figure 9: Economic Impact of Scenario 3a (2030, Impact Density)



Source: IDE-GSM simulation results

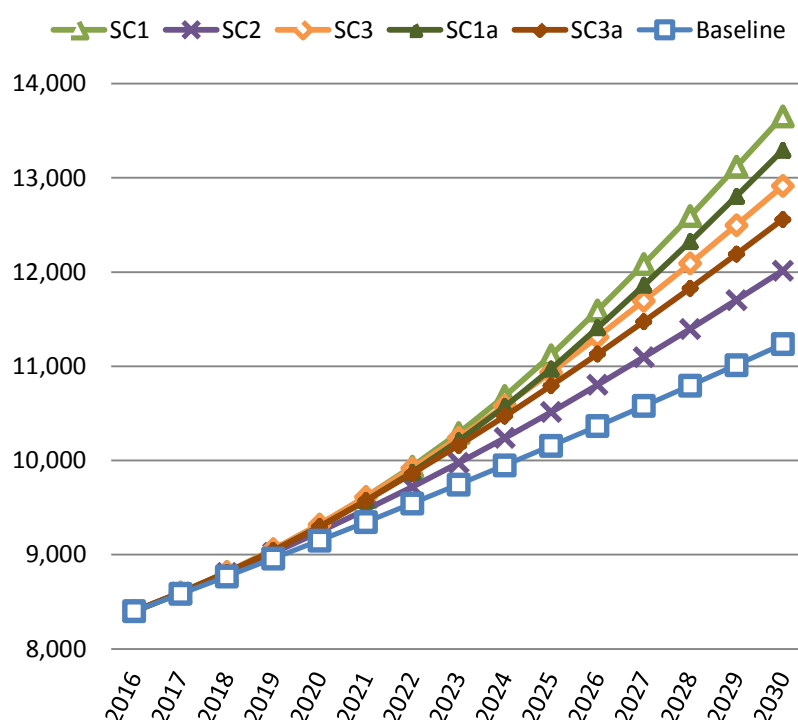
Table 3: Economic Impact by Scenario: Dispersing in 2021

	2030				
	SC1	SC2	SC3	SC1a	SC3a
Myanmar	98.4%	40.6%	58.4%	114.5%	76.3%
Yangon	287.7%	78.9%	153.8%	286.3%	154.0%
14 Regions	3.1%	49.6%	23.3%	26.6%	52.5%
Other Regions	4.3%	1.3%	1.7%	29.9%	26.8%

Source: IDE-GSM simulation results

The population of Yangon in Scenario 3a will be smaller than that in Scenario 1a and even that in Scenario 3 (Figure 10). In this regard, Scenario 3a has relatively larger power to restrain firms and households from moving into Yangon. Nevertheless, Figure 10 shows that the inflow of firms and households into Yangon is inevitable.

Figure 10: Estimated Population of Yangon by Scenario (1,000)



Source: IDE-GSM simulation results

Lastly, we touch on the economic impact on other countries by scenario (Table 4). Here, we compare Scenarios 1a and 3a. For Thailand, India, Bangladesh, and Japan, SEZ development and other measures will be favorable. For Thailand, Scenario 1a is better than Scenario 3a, whereas for India, Scenario 3a is better. China and Laos will be negatively impacted by the development in Myanmar. However, it should not be interpreted as being harmful. Figure 6, which illustrates the economic impact of Scenario 1a in 2030, describes how the development of Myanmar may benefit the central and western areas of China and the northern area of Laos and may prevent some firms or households in those areas from moving to the coastal cities of China or the capital city of Laos, compared with the baseline scenario. In this case, the economic impact may be negative, whereas the development of Myanmar may help the development of remote areas of China and Laos by stimulating the economies in those areas.

Table 4: Economic Impact on Other Countries

	2030	
	SC1a	SC3a
Myanmar	114.5%	76.3%
Thailand	1.00%	0.95%
China	-0.11%	-0.04%
India	0.17%	0.18%
Bangladesh	0.30%	0.40%
Laos	-0.58%	-0.21%
Japan	0.04%	0.04%

Source: IDE-GSM simulation results

6. Conclusion and Policy Implications

We outlined five different policy scenarios for the economic development of Myanmar compared them with the baseline scenario. The results showed how the different characteristics of policy measures affect national economic development, regional gaps in development, and inflow of firms and households into the largest city. Policy makers need to have a clear strategy that takes into account potential effects and potential risks of policy measures, as well as the key assumptions of each scenario, to guarantee the simulation results. This paper concludes with policy implications derived from the analyses.

First, among the five scenarios, concentrating development in Thilawa/Yangon until 2025 (Scenario 1) without any development in other regions will have the second-largest economic impact in 2030 on Yangon and on Myanmar as a whole. However, this scenario will likely see a huge inflow of firms and households into Yangon and call for massive infrastructure investment in Yangon, which may cause serious congestion in the city.

Second, a sudden dispersion of investment to 15 regions (Scenario 2) will lead to the lowest economic development of the country and of Yangon. Moreover, the other regions of the country that have no SEZ will also have the smallest economic impact among all five scenarios. The result implies that sudden dispersion will not work well to ensure higher economic development of the country as well as balanced development among regions.

Third, the development of a domestic corridor in the country in addition to the Yangon/Thilawa SEZ (Scenario 1a) will have the largest economic impact on Myanmar, Yangon, and remote regions of the country. Connecting the regions by road may help prevent excessive inflow of firms and households to Yangon to some extent.

Lastly, the inflow of firms and households to Yangon is inevitable as the economy grows. It is essential to provide adequate infrastructure in the Yangon area, thereby ensuring the economic growth of the country. To inhibit the economic stagnation of the country through serious congestion in Yangon area, the government of Myanmar may consider dispersing SEZ development to the other 14 regions only later (Scenario 3/3a), i.e., after they have accumulated enough SEZ experience and trained staff both in the public and private sectors in Yangon, even though this may result in lower the economic impact on Myanmar than that when investment is concentrated in Yangon.

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